

UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF MICHIGAN  
SOUTHERN DIVISION

EATON CORPORATION,

Plaintiff,

Case No. 03-74844

vs.

HON. GEORGE CARAM STEEH

ZF MERITOR LLC, ARVINMERITOR,  
INC. and ZF FRIEDRICHSHAFEN AG,

Defendants.

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ORDER DENYING DEFENDANTS' MOTION FOR SUMMARY  
JUDGMENT OF INVALIDITY OF '458 PATENT [DOC NO. 224]

The parties appeared before the Court on September 5, 2007 to argue defendants' motion for summary judgment of invalidity of the '458 patent as obvious in view of the prior art. 35 U.S.C. § 103. Defendants bring this motion for the first time due to the recent Supreme Court decision in KSR Int'l Co. v. Teleflex, Inc., \_\_\_ U.S. \_\_\_, 127 S.Ct. 1727 (2007), which substantially changed the legal analysis of an obviousness claim as previously developed by the Federal Circuit.

I. FACTS

A. Patent Claims

The '458 patent is directed to the semi-automatic control of a transmission for heavy duty trucks. The background section of the patent teaches that these truck transmissions have become more automated in recent years in an effort to simplify the task of commercial truck driving. The '458 patent teaches how to handle "rolling start" situations, where the truck is in neutral and the truck is rolling, yet the driver wants to engage a gear. Prior systems handled "rolling starts" in one of three ways: (1) always

select a preselected start gear ratio regardless of vehicle conditions such as speed; (2) require the driver to guess at the appropriate gear; or (3) require the driver to stop the vehicle before engaging a gear.

The '458 teaches that if the vehicle is rolling forward in neutral and the driver pushes the upshift selector, the system should automatically determine the appropriate gear to engage based on the current vehicle speed, rather than simply selecting the default start-off gear. (Caulfield Decl., March 3, 2006 at p. 8).

Claim 1 of the '458 patent is representative of the claims at issue in this case.

Claim 1 includes:

determining currently engaged transmission ratio;  
determining current vehicle speed; and  
if said transmission is in neutral (GR=N) and said vehicle speed exceeds a minimum reference value (OS>REF), automatically selecting operation in a rolling start mode of operation wherein a single movement of said shift selection lever in the upshift direction is interpreted as an operator selection of a direct shift from neutral into an appropriate rolling start gear ratio (GR<sub>RS</sub>), said appropriate rolling start ratio determined as a function of said current vehicle speed.

Defendant refers to the first phrase of Claim 1 as number (1) and the second phrase as number (2). Defendant then breaks the third phrase into three parts as follows:

- (3) if the transmission is in neutral and the vehicle speed exceeds a minimum reference value,
  - (a) automatically selecting operation in a rolling start mode of operation, wherein a single movement of said shift selection lever in the upshift direction is interpreted as an operator selection of a direct shift from neutral into an appropriate rolling start gear ratio,
  - (b) said appropriate rolling start ratio determined as a function of current vehicle speed.

Plaintiff maintains that it is improper for defendant to parse the "if" clause of claim 1 into three sub-elements, which are then compared to the prior art. Plaintiff argues that by doing this, defendants' comparison ignores the context of the "if" clause, which requires

interplay between the parsed sub-elements. Specifically, plaintiff argues that the particular clause - “if said transmission is in neutral and said vehicle speed exceeds a minimum reference value,” - must be applied to both parts (a) and (b) of section (3).

The Special Master construed step (3) to mean that “if the transmission is in neutral and the speed of the vehicle is higher than a reference speed, a move by the driver of the shift lever in the upshift direction is interpreted as a request for an appropriate rolling start ratio that is selected based on current vehicle speed.” The Report further explains that “automatically selecting operation in a rolling start mode of operation” means that “when the transmission processor receives an upshift request with the vehicle in rolling start mode of operation [i.e., when the transmission is in neutral and the vehicle is rolling forward], the processor automatically selects operation to an appropriate start gear.” The Report also concludes that the claims do not require a particular order of steps, and that the processor may check the conditions of neutral, vehicle speed, and upshift processor in any order.

The Court will look at step (3) in the way it was construed by the Special Master, regardless of how it is “numbered for clarity and convenience” by defendants in their brief. The other asserted independent claim is claim 12. Claim 12 is a system claim that includes a single limitation - logic rules for performing step (3) as recited in claim 1. Therefore, the single limitation of claim 12 is identical in scope to step (3) of claim 1.

The dependent claims 3-6 and 14-17 include all of the limitations of the corresponding independent claims (1 or 12) from which they depend, as well as an additional limitation. The Special Master has construed these claims to require that “the start gear ratio must meet one of the four specific numerical ratios, i.e. engine speed divided by output shaft speed as set out in each particular claim.” (Special Master

Report at ¶ 23).

B. Prior Art

1. Dobson

The Dobson prior art reference actually refers to two Eaton prior art patents. Dobson describes systems that shift into a start gear ratio from neutral at low vehicle speeds, which necessarily requires determining both the currently engaged gear and the vehicle speed. Additionally, Dobson teaches that “a single movement or pulse of [the] lever 1 in an upshift direction from neutral” will be interpreted as the driver’s request for a shift to an appropriate start gear ratio when the vehicle is in a rolling start mode of operation. Dobson utilizes a pre-selected gear ratio<sup>1</sup>, so when the driver initiates an upshift, the vehicle must slow down to the correct speed for that preselected gear before the transmission actually shifts from neutral into gear.

2. IVECO

The IVECO reference, which was neither cited to nor considered by the Examiner in the prosecution of the ‘458 patent, discloses a semi-automated transmission system that automatically selects an optimum gear based on driving conditions. The IVECO reference teaches determining the currently engaged gear ratio and the current vehicle speed. The reference describes a gear selection process in which the system calculates a gear ratio based on a signal indicative of output shaft speed. IVECO thus teaches selecting an appropriate gear ratio based on current vehicle speed, thus allowing an immediate shift without the need for the vehicle to slow

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<sup>1</sup> Defendants contend that Dobson’s preselected starting gear is determined by inputs which could include current vehicle speed. For purposes of this motion, however, plaintiff’s interpretation of starting gear as preset and fixed will be used.

down to the correct speed for a preselected gear.

## II. LEGAL STANDARD FOR ANALYSIS OF INVALIDITY BASED ON OBVIOUSNESS

The principle underlying § 103 is that if an invention would naturally follow from combinations or applications of prior art, then it does nothing to promote the progress of the art regardless of its novelty or usefulness. In Graham v. John Deere Co., 383 U.S. 1 (1966), the Supreme Court interpreted § 103 to meet the constitutional standard for obviousness. Three inquiries were drawn directly from the language of the statute: (1) the scope and content of the prior art, (2) the level of ordinary skill in the art; and (3) the existence of any differences between the claimed invention and the prior art as it existed at the time of invention. The Court also found that other traditional factors, such as long-felt but unmet needs, the failure of others, and commercial success, may be relevant to whether the claimed invention was obvious. The Federal Circuit, in its decisions, recognized that an inquiry into the obviousness of an invention posed the risk of using hindsight to invalidate patents. That court therefore developed what became known as the teaching, suggestion, or motivation (TSM) test, which requires finding some basis, from the perspective of a person of ordinary skill in the art at the time of invention, for combining prior art references.

In KSR Int'l Co. v. Teleflex, Inc., \_\_\_ U.S. \_\_\_, 127 S.Ct. 1727 (2007), the Supreme Court clarified the standard for obviousness under § 103, and particularly the TSM test as delivered by the Federal Circuit. Id. at 1734-35, 1739. The Court held that an obviousness determination does not require rigid application of the TSM test, not even at the summary judgment stage. Id. at 1739, 1741. The Court recognized that a specific teaching, suggestion, or motivation to combine prior art references may not exist because “it often may be the case that market demand, rather than scientific

literature, will drive design trends.” Id. at 1741. Instead, testimony from expert witnesses may be considered to understand why it would have been obvious to one of ordinary skill in the art to combine the prior art in a particular way. “[T]he analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” Id. “If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability.” Id. at 1740. “Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility.” Id. at 1741.

### III. ANALYSIS

#### A. Claims 1 and 12

##### 1. Steps 1 and 2

The parties’ experts agree that the steps of determining currently engaged transmission ratio and current vehicle speed were well known features of semi-automatic transmissions.

##### 2. Step 3

Step 3 of the ‘458 patent requires a “direct shift” from neutral into an appropriate rolling start gear ratio. Defendants maintain that this step is taught by the Dobson reference, which in at least the embodiment plaintiff focuses on, teaches shifting from neutral to a preset gear. Plaintiff argues that Dobson teaches delaying the shift until the engine speed slows down to the appropriate RPM for the preselected gear, and that such a delay is by definition not a “direct shift”.

The term “direct” was not identified as a disputed term during claim construction.

Because claim construction is a legal issue, not a factual one, the Court must determine what the term “direct” means in the ‘458 patent. The dictionary defines the term “direct” as “straight; undeviating < a direct line >.” Black’s Law Dictionary, 7<sup>th</sup> ed. (1999). This definition does not include a time element, but rather describes a movement from point A to point B without any intervening stops along the way.

The ‘458 patent uses the term “directly” a second time, in the description of the preferred embodiment, as follows:

If, in sixth gear as shown, the operator moves the lever forward three times in quick succession, then allowing its return to rest, he will skip two gears in effect, and achieve a skip shift directly into ninth speed (i.e., seventh and eighth speed will not be engaged) almost instantaneously.

(458, col. 6, ll. 18-23) (emphasis added). This use of the term “directly” suggests the absence of an intervening point, as it points out in the parenthetical that the intervening gears are not engaged. The abbreviation “i.e.” means “that is”, Black’s Law Dictionary, 7<sup>th</sup> ed. (1999), so in the parenthetical the patent explains what it means when it uses the term “directly”. The patent language does go on to state that the shift is almost instantaneous, but that is an additional feature of the shift, and not a definition or an elaboration of the word “directly”.

“Direct” is not a technical term, and its meaning in the context of the patent claim is “without engaging any intervening gears” as follows: when the transmission is in neutral and the vehicle speed exceeds a minimum reference value, a single movement of the shift lever in the upshift direction will be interpreted as a shift from neutral to an appropriate rolling start gear determined as a function of current vehicle speed without engaging any intervening gears.

Therefore, Dobson teaches that “a single movement or pulse of [the] lever . . . in

an upshift direction from neutral” will be interpreted as the driver’s request for a direct shift to an appropriate start gear ratio when the vehicle is in a rolling start mode of operation. Defendants then point to IVECO as prior art teaching that the appropriate start gear is determined as a function of current vehicle speed.

Plaintiff’s expert, Dr. Caulfield, acknowledged in his deposition that IVECO teaches selecting a starting gear that would result in maximum torque, and is based on what is referred to as “signal 23”. Dr. Caulfield further testified that signal 23 is proportional to and representative of current vehicle speed. (Caulfield dep. at 289:13-16, 291: 7-13).

Plaintiff points out that claim 1 of the ‘458 patent requires that the transmission be in neutral, and contends that IVECO only works if the N (neutral) button has not been pressed. (Referring to Figure 4, Block 26). Therefore, according to plaintiff, the logic relied upon by defendants can only be reached if the transmission is not in neutral. Plaintiff’s characterization of IVECO, as supported by Dr. Caulfield in his KSR Declaration, is incorrect. Block 26 verifies whether the driver has pressed the neutral button to request a shift to neutral, not whether the transmission is already in neutral. Thus, the NO path out of Block 26, which leads to the relevant starting gear selection logic, means that the driver has not just pressed the neutral button. It makes sense that the driver would not press the neutral button when requesting a starting gear shift. Plaintiff’s disagreement is, furthermore, immaterial for purposes of this motion, because the “shift from neutral” teaching comes from the Dobson prior art references. The Court finds that IVECO does teach determining an appropriate rolling start gear based on current vehicle speed as argued by defendants.

KSR requires a reasoned basis for combining multiple teachings, such as

Dobson and IVECO in this case. Dr. Davis' explanation of why it would have been obvious to one of ordinary skill to combine the teachings of Dobson and IVECO is cursory, and conclusory. (Davis Updated Expert Report, ¶¶ 177-182, 206-211).

In my opinion, the combination of the [IVECO] and [Dobson] patents also describes each and every limitation of Claim 1. The teachings of the [IVECO] and [Dobson] patents are described above. Both the [IVECO] patent and the [Dobson] patent teach methods to reduce the problems associated with selecting an appropriate gear during rolling start conditions. In addition, the methods taught by both patents are intended for use in industrial vehicles such as heavy duty trucks with semi-automatic mechanical transmissions. Based on my review of the references, and my experience and knowledge with vehicle drivetrain systems, one of ordinary skill in the art would have been motivated to combine these references discussed above to create the claimed invention.

(Davis Updated Expert Report, ¶ 182).

Defendants additionally argue that common sense demonstrates the requisite reason for combining the teachings of Dobson and IVECO. Dobson allowed a driver to select a preset starting gear with a single movement of the shift lever. The IVECO reference offered an improvement by selecting a starting gear based on current vehicle speed. In addition, it was known that the post-shift engine speed (ES) equals output shaft speed (OS) times the gear ratio (GR). (Davis Decl. at ¶ 42). Defendants argue the most obvious way to avoid over-speeding or stalling the engine is to use this known equation ( $ES = OS * GR$ ) and the current vehicle speed to determine an appropriate gear ratio. Defendants contend that the combination of Dobson and IVECO merely automates what the driver manually did before based on vehicle speed using multiple shifts; it also achieves what fully automatic systems did without a shift lever movement.

Plaintiff counters defendants' "common sense to combine" argument by pointing out that in the 1990s there was a long period when transmission designers were trying

to come up with responsive approaches to starting shift management. (Caulfield KSR Decl. at ¶ 19). Plaintiff argues that the long felt need for responsive approaches to starting shift management, and the numerous inferior solutions embodied in the prior art of record, are factors that weigh against a finding of obviousness under KSR. These arguments are not answered by Dr. Davis for defendants.

While defendants' argument in favor of finding motivation to combine the prior art references has merit, the lack of expert testimony in support, as well as the relevant issues raised by plaintiff, require the Court to deny summary judgment of invalidity based on obviousness. The opinions expressed by Dr. Davis certainly describe the desirability of combining these references, but the means selected and the reasons for such significant delays before the '458 was proposed are not explained. There are issues of fact regarding whether it was reasonable for one skilled in the art to combine the prior art references, which must be presented to the jury in this case.

#### B. Dependent Claims

Having found an issue of fact as to obviousness with regard to the independent claims, the Court also denies summary judgment of invalidity due to obviousness for the dependent claims.

#### IV. CONCLUSION

For the reasons stated above, defendants' motion for summary judgment of invalidity of the '458 patent is DENIED.

Dated: October 4, 2007

S/George Caram Steeh  
GEORGE CARAM STEEH  
UNITED STATES DISTRICT JUDGE

CERTIFICATE OF SERVICE

Copies of this Order were served upon attorneys of record on  
October 4, 2007, by electronic and/or ordinary mail.

s/Josephine Chaffee  
Deputy Clerk